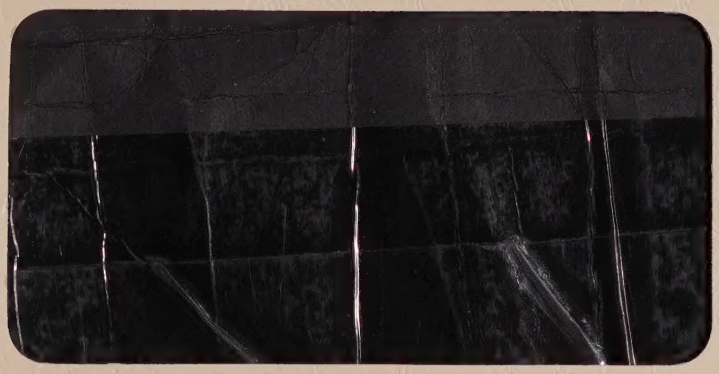
DENTON VACUUM INC.



MP MASTER
MA26202

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OPERATING INSTRUCTIONS
FOR
DENTON VACUUM
DESK II COLD SPUTTER ETCH UNIT
with Carbon Evaporation Accessory

Refer to Job No. 16240
when ordering spare parts.

DENTON VACUUM, INC.
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DRAWINGS

The drawings checked below pertain to your unit:

✓	General Arrangement	D-0131-007-001-C
___	General Arrangement (Large Desk)	D-0131-007-025-C
✓	Main Electronic Schematic	D-0131-007-127-E
✓	Logic PC Board Schematic	D-0131-007-128-D
✓	Sputterhead Assembly	D-0131-007-006-C
	Rebuilding Kit for Sputterheads	21
___	Sputterhead Assembly (Large Desk)	D-0131-007-026
___	Carbon Rod Evaporation Accessory	C-0108-018-020

____ Carbon Yarn Evaporation Accessory C-0131-005-009
____ Electrical Schematic (120V) A-0075-020-003-B

MANUALS & INSTRUCTIONS

✓ Ulvac Vacuum Pump G-50D
____ DTM-100

1. INTRODUCTION

1.1 GENERAL DESCRIPTION

The Denton Vacuum DESK II Cold Sputter/Etch Unit is designed to clean the surface of SEM specimens and to deposit heavy metal conductive coating on the clean surface. A standard 6" diameter Pyrex cylinder with top and bottom gaskets sits on a stainless steel baseplate. *(The Pyrex cylinder on the Large Desk II model is 10").* The cylinder is evacuated by a 2 cfm, two-stage direct-drive mechanical pump mounted within the cabinet. An insulated specimen table with provision for height adjustment is mounted within the Pyrex cylinder on standard models. *(On Large Desk II models the specimen table rotates).* The sputter cathode (gold is standard) is clamped to an insulated aluminum plate in the chamber cover. On standard models, a manual shutter is provided to shield the sputter cathode from contamination during the etch cleaning cycle. The shutter control knob is left of the chamber.

The cabinet contains a DC power supply rated 0-1200V, 0-50 milliamps. The front control panel, left to right, has the process control push buttons: ETCH *(Etch is not available on 10" cylinder model)*, SPUTTER, and OFF. The gas flow control knob is beneath the red LED bar pressure indicator. Next are the START/STOP buttons for manual operation. The current adjust knob is beneath the red LED bar power indicator. The preset timer controls the timed operation. In automatic mode, the numerical display shows time in seconds remaining. In manual mode, it shows time elapsed. The START/STOP buttons control the timed operation.

The main power switch is on the lower right side of the cabinet. It controls power to the unit and also activates the mechanical pump and vent valve. The vent valve closes when the mechanical pump starts and opens when the pump stops.

When the SPUTTER or ETCH button is pushed, a gas bleed opens automatically to flush the chamber and to prevent backstreaming. The bleed rate is adjusted by a needle valve (the gas flow control knob).

High voltage is available only when the sputter chamber pressure is less than one Torr.

WARNING!

DO NOT TURN ON SPUTTER POWER WITH PRESSURE ABOVE 200 mT.

For servicing and inspection convenience, the front and rear panels are hinged and are held with secured screws. Electrical interlocks are installed behind each panel to prevent inadvertent operation with the panels opened.

1.2 INSTALLATION

Place the Desk II in the desired location. Connect the power cord to a 120V, 60Hz, 10 amp outlet. The white switch in the rear panel is the main circuit breaker. It should be in the "up" position.

Remove the foam cylinder supporting the sputterhead and save it. Clean baseplate and gaskets using acetone and a lint free cloth. Grease gaskets very lightly if needed. Sufficient grease has been applied when a finger is barely able to slide around the gasket. Place chamber on baseplate. Position sputterhead on chamber.

Check manual shutter movement *(on standard Desk II models)*. The two segments should overlap when positioned at back of chamber. This is the open position for sputtering. Rotate knob clockwise to spread the segments, then move the spread shutter back over specimen pedestal. This is the position for etching.

The gas connection is for ⅛" inside diameter high vacuum type hose at the upper rear right of the cabinet. Argon is recommended. The argon cylinder should have a pressure reducing regulator to provide 2 to 10 psig to the unit. Tygon tubing is suitable for use.

Add the provided oil to the mechanical pump. This is done by removing the mist filter from the pump. When the oil is at the center of the sight glass, the pump is ready. Refer to steps 1 through 7 on pages 15 and 16.

The Desk II is ready for operation.

NOTE

If returning unit to DVI for service, oil must be drained from the mechanical pump.

2. INITIAL START UP

2.1 INSPECTION

Before starting up the unit, make sure the following is provided:

1. 120V, 60Hz, 10 amp service.
2. 5 psig argon gas. 1 cu ft argon / day
3. All lines are properly connected and there are no loose wires, hoses, or hardware.
4. Check rotary motion:

   Standard on 10" model, option on 6" model

   a. Make sure the small sprocket is spaced from feedthrough nut by at least 1/16".

   b. Make sure that the chain is not tight. It should be slightly limp.

Check the mechanical pump oil level only after it has been running for a few minutes. This will give the oil a chance to be distributed throughout the pump and will give a more accurate level reading.

2.2 START UP PROCEDURE

Place samples on pedestal. Position Pyrex cylinder in center of baseplate. Put sputterhead down on Pyrex cylinder.

1. Turn on main power.
2. Mechanical pump starts.
3. Vent closes.
4. After three seconds of pumping, you should not be able to lift the sputterhead. If possible, turn off unit and reposition cylinder and sputterhead.

2.3 TILTING OMNI

If this unit has a tilting omni assembly installed in lieu of a shutter and etching mode, the rotation speed and power switch are located on the top of the unit to the left of the chamber.

Units with a tilting omni have a 6" diameter x 6" high Pyrex chamber.

NOTE

THE SYSTEM VENTS AUTOMATICALLY WHEN THE PUMP IS TURNED OFF TO PREVENT OIL BACKSTREAMING.

3. MODES OF OPERATION

To operate the ETCH and SPUTTER modes, use the following procedures:

Place samples on pedestal. Position Pyrex cylinder in center of baseplate. Put sputterhead down on Pyrex cylinder.

Turn on main power. Mechanical pump starts. Vent closes. After three seconds of pumping, try to lift sputterhead. You should not be able to do so. If you can, turn off unit and reposition cylinder and sputterhead.

WARNING!

BE SURE THAT CURRENT SETTING IS AT ZERO.

3.1 ETCH *(Standard Desk II only)*

1. Let the chamber pump down to 30 millitorr or less. Push ETCH button. A click indicates the gas inlet valve has opened. The pressure will rise momentarily as the pulse of gas between the shutoff and needle valves is purged through the line. If it rises to the last LED, the system will jump out of the ETCH mode and the ETCH button will have to be pressed again.

2. After the system pumps down to 50 millitorr, adjust the gas flow control knob so pressure rises to 125-150 millitorr. This is proper etch pressure.

WARNING!

DO NOT TURN ON ETCH CURRENT WHEN PRESSURE IS ABOVE 200 mT

3. Move shutter knob clockwise to spread shutter, then move it counterclockwise to cover pedestal.

4. Push START button (manual or timed). Bring current up to 5 milliamp level. (Etching to remove surface contamination can be done at 5 milliamps for 30 seconds. No more than two LEDs should be lit when using the ETCH mode.)

5. The power turns off automatically when using the timed mode. If in manual mode, push STOP button when sufficient etch time has elapsed.

6. Reduce current setting to zero.

3.2 SPUTTER

1. The SPUTTER button can be pushed after the completion of an ETCH run or after the system has just been turned on and pumped down. Again, you should hear a click as the SPUTTER button is pushed and the gas inlet valve opens.

2. Pump down system pressure and stabilize at about 50 millitorr by adjusting the gas flow control knob.

3. Open shutter *(on standard Desk II only)* OR turn on and adjust rotation table (10" cylinder model).

4. Push MANUAL START button. Bring current up to 45 milliamps.

NOTE

SPUTTERING GOLD AT 50 MILLITORR 45 MILLIAMPS FOR 30 SECONDS WILL GIVE A COATING OF 100 ANGSTROMS ON A SMOOTH SURFACE. A VERY ROUGH SURFACE CAN REQUIRE TWICE THIS AMOUNT OF TIME.

A COATING, WITH ROTATION, OF 100 ANGSTROMS WOULD TAKE APPROXIMATELY 1.5 MINUTES.

5. Run for the desired time.

6. Push the MANUAL STOP button to terminate the sputtering.

7. Reduce current setting to zero.

8. Push main power OFF. The mechanical pump stops and the vent valve opens automatically to prevent pump backstreaming.

Once the desired settings of time, current, and gas flow have been settled, the timed mode for either etching or sputtering can be operated:

AUTO TIME OPERATION

1. Push main power ON and pump down to less than 30 millitorr.

2. Set desired run time.

3. Push SPUTTER or ETCH and allow system pressure to stabilize at 50 or 125 millitorr. *(On 10" cylinder model, turn on and adjust rotation table.)*

4. Push TIMED START. The process will begin as the timer counts down from the preset value.

5. Raise current to desired level.

6. At completion, reduce current setting to zero.

7. Push main power OFF. The mechanical pump stops and the vent valve opens automatically to prevent pump backstreaming.

3.3 OPTION

QUARTZ CRYSTAL MONITOR DTM-100-II

The crystal sensor is mounted in the Desk II chamber through the base plate.

To operate the crystal monitor:

1. Pump down chamber to 50 to 70 mT.

2. Press sputter to open gas line.

3. Set pressure to 50 to 70 mT.

4. Press ZERO to reset thickness.

5. Press OPEN SHUTTER to start monitor (if the lights flash, press ZERO again).

   NOTE: The manual start push button will no longer function in units when a crystal monitor has been installed. Auto time may be used as long as the thicknesses are programmed above expected values sputtered.

6. Set current to 40 ma. and adjust to maintain if necessary. Leave current setting for future depositions.

7. When final thickness is achieved, power supply will shut off. If you wish to terminate the deposition before the final thickness is reached, press shutter CLOSED, then either stop push button on the front panel.

8. Program has been preset for the following:

Density - 19.3 g/cc (gold)	16.38 g/cc (Au/Pd)
Acoustic Z - .381	.372
* Set Point - 100Å - 500Å	same
Tooling factor - 300%	same

   * Final thickness may be programmed in as desired by pressing "Program" and then pressing "Enter" until final thickness shows up. Then press "Up" or "Down" to set thickness. Density and Z may also be changed for different materials.

4. GENERAL MAINTENANCE

The Desk II will operate more efficiently if kept clean. Scale build-up on the baseplate should be scraped off weekly and the surface cleaned with acetone or alcohol using a lint free cloth or paper and solvent. Be sure all debris is vacuumed away. Clean coating build-up from the cylinder with a metal polish. "Wenol" or "Pol" is recommended. These polishes clean off the coating deposit and polish the glass.

To ensure a proper vacuum seal, inspect the cylinder gaskets for nicks, cracks, and other foreign material. Apply a thin coat of vacuum grease to the gaskets and immediately wipe off the grease to prevent excessive grease build-up. Inspect the sealing surface for nicks or scratches. These must be smoothed out with emery and polished with fine emery or Scotch Brite. Any deposit build-up must be similarly removed and the entire surface wiped clean with acetone or alcohol. Vacuum the baseplate to remove all debris and powder deposits.

Mechanical pump oil should be changed annually or whenever it becomes contaminated. Check oil level and condition. If the oil appears cloudy or brownish, it needs changing. The oil is changed by opening the drain at left side rear of cabinet.

CAUTION!

DO NOT ATTEMPT TO RE-ALIGN, OR MOVE DRAIN VALVE IN EITHER DIRECTION. METAL CASTING WILL BE DAMAGED. USE PLASTIC TUBING IF NECESSARY TO FACILITATE DRAWING.

Pour 270 ccs of mechanical pump oil into the exhaust port to refill. Oil level is read accurately only when the pump is operating and pressure is lower than one Torr.

To change the sputter target, remove four screws from clamping ring. Remove ring and used target. Wipe aluminum plate and ring with acetone and a clean lint free cloth. Center new sputter disc on aluminum plate between screw holes. Replace clamp ring and screws. Curved tweezers are handy to position screws; a rubber finger cot is useful in centering the gold.

If the plasma is flickering during either sputtering or etching, the problem is a high voltage short in the system from coating across insulated areas:

1. If during etching, then take the pedestal apart and clean the Teflon disc.
2. If during sputtering, the sputterhead must be taken apart and the thin Teflon disc cleaned. Call the factory if guidance is needed in this area.

5. TROUBLESHOOTING

If the chamber does not pump below 50 millitorr, check the position of the sputterhead. It must seat on the top chamber gasket. Check that the Pyrex cylinder is centered in the countersink of the baseplate. Check cleanliness of top and bottom gaskets. Clean with acetone and lint free cloth and regrease. Check Pyrex cylinder for chipping.

If the pump does not come on:

1. Check that circuit breaker in the back is in the "up" position.

2. Check the two 5 amp and 10 amp fuses inside the back panel.

If you cannot get sputtering or etching current, check:

1. That the fuse (2A slow blow) on the high voltage board is good;

2. That the wires from the sputterhead are connected to the high voltage board;

3. That you hear a "click" when the SPUTTER or ETCH mode is selected. If not, call the factory.

SUGGESTED SPARES

DESK II

PART NO.	DESCRIPTION	PRICE
5104-010	Mechanical Pump Fluid	$ 3.00/300cc 5.45/quart
A-0108-009-066-1	Gold Target	199.00
A-0108-009-066-2	Gold-Palladium Target	199.00
5108-004	Thermocouple Tube DV-23	116.00
5078-004	5 Amp Fuse	2.00
3120002	2 Amp Fuse	2.00
5078-005	10 Amp Fuse	2.00

MINIMUM ORDER $25

DENTON VACUUM INC.

SPARE PARTS LIST

DESK II

JOB #

#	PART NO.	DESCRIPTION	LOCATION	QTY.	PRICE EA.
1	5110-025	6" DIAMETER X 4" HIGH PYREX CYLINDER	STANDARD DESK	1	$ 62.00
2	5110-037	6" DIAMETER X 6" HIGH PYREX CYLINDER	DESK WITH TILTING OMNI	1	75.00
3	5110-026	6" DIAMETER X 9" HIGH PYREX CYLINDER	CARBON EVAPORATION ACCESSORY	1	176.80
4	5110-033	8" DIAMETER X 4 1/2" HIGH PYREX CYLINDER	LARGE DESK	1	346.00
5	5110-038	10" X 4 1/2" HIGH PYREX CYLINDER	LARGE DESK	1	393.00
6	5110-034	12" DIAMETER X 4 1/2" HIGH PYREX CYLINDER	LARGE DESK	1	535.00
7	5091-008	6" CYLINDER GASKET	STANDARD DESK	2	22.00
8	5091-004	8" CYLINDER GASKET	LARGE DESK	2	25.00
9	5091-005	10" CYLINDER GASKET	LARGE DESK	1	21.45
10	5091-001	12" CYLINDER GASKET	LARGE DESK	2	27.30
11	5104-010	MECHANICAL PUMP FLUID	MECHANICAL PUMP	300 cc	$3/300 cc 5.45/QT.
12	5014-006	O-RING	SPUTTERHEAD ASSEMBLY	3	.60
13	5013-010	O-RING	SHUTTER & GAS INLET	2	.75
14	5013-210	O-RING	SHUTTER & GAS INLET HIGH VOLTAGE FEEDTHROUGH	2	.85
15	A-0108-018-044-1	CATHODE FEEDTHROUGH INSULATOR	SPUTTERHEAD ASSEMBLY	1	8.84
16	A-0108-018-044-2	CATHODE SUPPORT SCREW INSULATOR	SPUTTERHEAD ASSEMBLY	1	7.25
17	A-0108-018-045	CATHODE BUSHING	SPUTTERHEAD ASSEMBLY	2	6.24
18	A-0108-009-066-1	GOLD CATHODE	SPUTTERHEAD ASSEMBLY	1	199.00

ALL PRICES SUBJECT TO CHANGE MINIMUM ORDER $25 FOB MOORESTOWN, NEW JERSEY 05/93SW

DENTON VACUUM INC.

SPARE PARTS LIST

DESK II

JOB #

#	PART NO.	DESCRIPTION	LOCATION	QTY.	PRICE EA.
19	A-0108-009-066-2	GOLD PALLADIUM CATHODE	SPUTTERHEAD ASSEMBLY	1	$199.00
20	A-0108-018-087	ANODE GRID	SPUTTERHEAD ASSEMBLY	1	39.00
21	A-0108-018-049	ANODE INSULATOR	SPUTTERHEAD ASSEMBLY	1	10.60
22	5108-004	DV-23 GAUGE TUBE	BASEPLATE	1	116.00
23	A-0084-039-036	CERAMIC BUSHING	CARBON ACCESSORY	2	12.61
24	5001-026	H-V TRANSFORMER	CABINET	1	92.00
25	A-0084-001-059	CARBON RODS 1 1/2" LONG	CARBON EVAPORATION ACCESORY		151.00 PER 100
26	5095-002	12" CARBON RODS HIGH PURITY - 3 MM DIA.	CARBON EVAPORATION ACCESSORY		70.00 FOR 10
27	HEINEMANN JA-1-A3-A-1-3	1A 250V MAGNETIC CIRCUIT BREAKER	REAR PANEL (OLD STYLE)	1	18.75
28	JA1S-A-8-A-10-10	10A 250V MAGNETIC CIRCUIT BREAKER	REAR PANEL (NEW STYLE)	1	36.00
29	8503-D1A-4A-1-A	BROOKS MICROMETER VALVE	FRONT PANEL	1	167.96
30	5078-004	FUSE, 3AG, 5A	CABINET (DC POWER SUPPLY)	1	2..00
31	312002	FUSE, 2A, SLOW BLOW	HIGH VOLTAGE BOARD	1	2..00
32	5095-004	CARBON YARN	CARON EVAPORATION ACCESSORY		79.00 FOR 25 FT.
33	G-50D	ULVAC MECHANICAL PUMP	CABINET	1	1,164.00
34	A-0131-007-118	TEFLON RING		1	14.00
35	A-0131-007-113	TEFLON WASHER		1	12..74
36	A-0108-009-046-3	RETAINING RING FOR 50 MM X 50 MM TARGETS	SPUTTERHEAD ASSEMBLY	1	60.00

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DENTON VACUUM INC.

SPARE PARTS LIST

DESK II JOB #

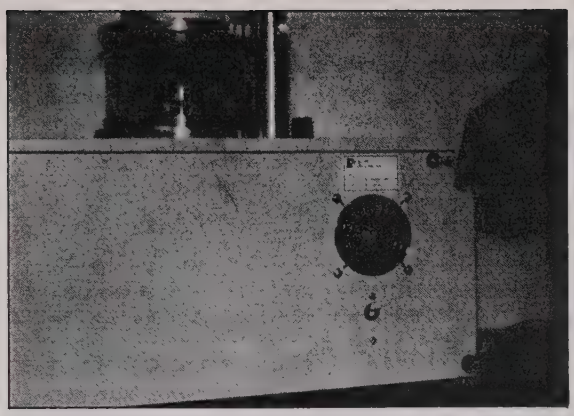
#	PART NO.	DESCRIPTION	LOCATION	QTY.	PRICE EA.
37	12480	SHARPENER	CARBON RODS		$319.00
38	A-0084-039-035	SPRING	CARBON ACCESSORY	1	11.18
39	9544T45	½" DIAMETER VACUUM HOSE	PUMP TO CHAMBER		10.29 FT.
40	9955-12-371H	MIST FILTER	MECHANICAL PUMP	1	55.00
41	A-0084-039-033	⅛" STATIONARY CHUCK	CARBON EVAPORATOR	1	39.00
42	A-0084-039-034	MOVABLE CHUCK	CARBON EVAPORATOR	1	35.25
43	3814-1	CLEAR TUBING		8 FT.	8.00
44	16-B-3375	H. V. FEEDTHROUGH	BASEPLATE	1	63.95
45	5078-005	FUSE, 10 AMP	CABINET (MECHANICAL PUMP)	1	2.00
46	1743	RUBBER BUMPER	BOTTOM OF CABINET	5	1.00
47	LRA-911-RS/120N	SWITCH	RIGHT SIDE OF CABINET	1	19.45

PRICE LIST

TARGETS FOR DESK II AND DSM-5A

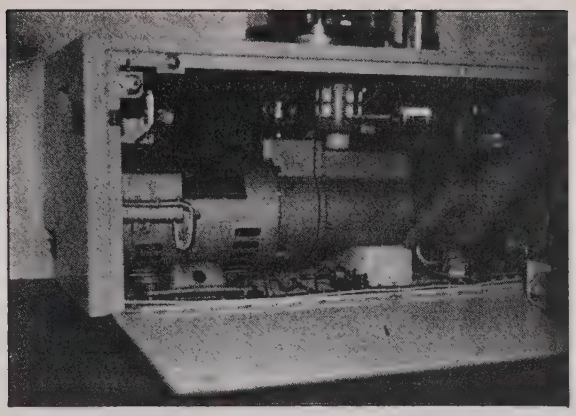
PART NO.	MATERIAL	THICKNESS	PRICE
2" Diameter			
A-0108-009-066-2	(Au/Pd) Gold/palladium	.002	199.00
A-0108-009-066-1	(Au) Gold	.002	199.00
50 mm sq.			
A-0108-009-066-3	(Pt) Platinum (99.998%)	.1 mm	On request
A-0108-009-066-14	(Re) Rhenium (99.97%)	.1 mm	On request
A-0108-009-066-13	(Fe) Iron	.1 mm	174.00
A-0108-009-066-12	(Ir) Iridium	.1 mm	On request
A-0108-009-066-11	(Pd) Palladium (99.9975%)	.1 mm	On request
A-0108-009-066-10	(Ta) Tantalum	.127 mm	55.00
A-0108-009-066-9	(Ni) Nickel	.1 mm	165.00
A-0108-009-066-8	(In) Indium	.1 mm	104.00
A-0108-009-066-7	(Ag) Silver	.1 mm	55.00
A-0108-009-066-6	(Ti) Titanium	.127 mm	267.00
A-0108-009-066-5	(Cu) Copper	.1 mm	87.00
A-0108-009-066-4	(Pd) Palladium (99.9%)	.1 mm	On request
A-0108-009-066-3	(Pt) Platinum	.1 mm	On request
A-0108-009-046-3	Cathode retainer for 50 mm square targets		60.00

Precious metal prices subject to change with market value.



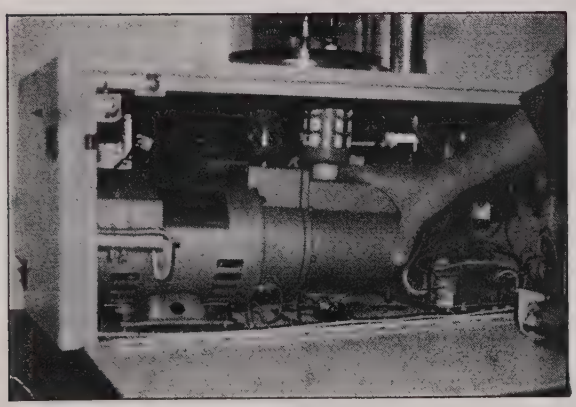
Step 1

Remove screws from back panel.



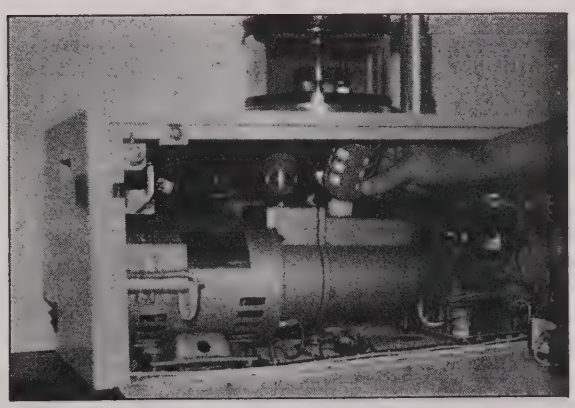
Step 2

Remove styrofoam from under mechanical pump.

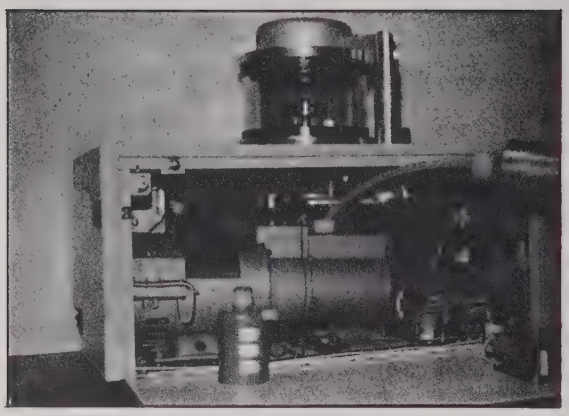


Step 3

Push down end of pump **while** unscrewing the exhaust filter. Although it is a tight fit, the filter will come out. The plastic sleeve remains on the pump.

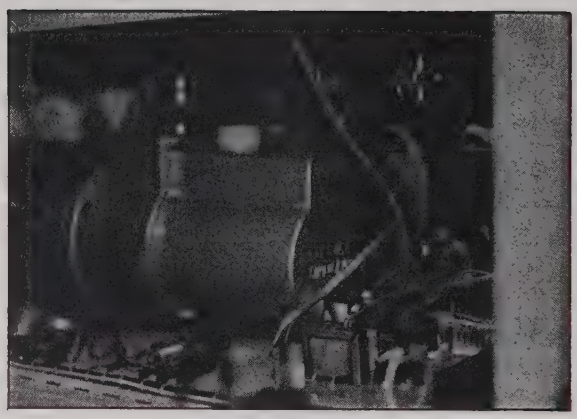


Step 4

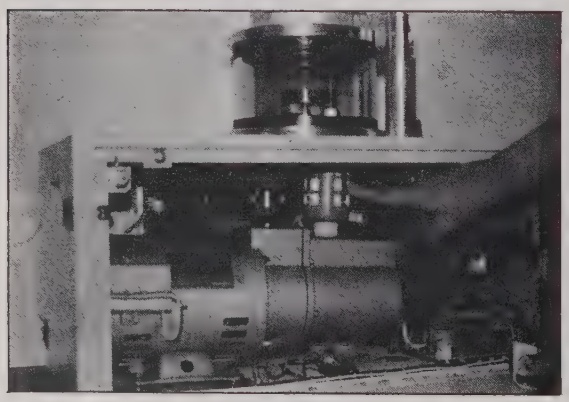


Step 5

Fill pump unit until oil reaches center of the red ring on sight glass. Check again after running pump below one Torr. **DO NOT OVER FILL PUMP.**



Step 6



Step 7

Replace exhaust filter by pushing down on pump and popping filter in from side. Save all tubing, sponge and containers.

OPERATING INSTRUCTIONS FOR OPTIONAL CARBON EVAPORATION ACCESSORY FOR DESK II

If you have selected the Carbon Evaporation Accessory, you will need the following tools and facilities:

1. 110V, 60Hz, 20 amps electrical outlet.
2. 5 psig argon (usually supplied from a tank with two-stage regulator and Tygon tubing).
3. Emery board or file to file flattened section of carbon rods.
4. 1/16" diameter swizzle stick to push carbon rods through opening in sleeves.
5. Welders goggles or equivalent to permit viewing evaporation process.

WARNING!

Use dark glass to observe carbon evaporation. Intense brightness is harmful to eyes when viewed directly.

To check your carbon evaporation technique, before coating samples, do the following:

Coat a glass cover slip with gold.
When the cover slip is overcoated, the gold color will change
to copper with 100Å of carbon;
to orange with 150Å of carbon and
to purple with 200Å.

OPERATING THE CARBON ROD EVAPORATION ACCESSORY

The Desk II vacuum pumping system can be used to evacuate a glass cylinder with a carbon evaporation source mounted in the metal cover. The source can be mounted so as to vary the source-to-specimen distance from 3 1/2" to 5".

Two carbon rods are positioned in the center of the "yoke" to do the coating. One rod will have a point or reduced section. The other will have a full diameter section that has been carefully flattened on the end touching the point (or reduced section) of the other rod.

Both carbon rods should be inserted, one after another, through the outside end of the fixed rod holder. First, the pointed rod should be inserted (point trailing) and pushed through with the flattened carbon rod to move into the moving rod holder. Continue pushing the rods until the flat spring is deflected about 1/8 inch. Tighten the thumb screw holding the flattened carbon in the fixed holder. If using a reduced section carbon rod, the spring should be moved out a little more than the length of the reduced section.

With the carbon source loaded, place the Pyrex cylinder on the baseplate, seat the source head, and start pumpdown. Within two to three minutes the chamber vacuum gauge should read about 50 millitorr. Push the ETCH button. You will hear a click as the gas solenoid opens. This will backfill the chamber with argon. Push OFF to close the gas solenoid and to allow the chamber to pump down again. Repeat this procedure twice to reduce the level of oxygen in the chamber.

With the gas on, adjust the needle valve to obtain 30 to 50 millitorr. Turn on FILAMENT POWER on the Carbon Evaporation Module. Rotate powerstat clockwise to obtain 15 amp reading on ammeter. Carbon point should be bright red and outgassing. Increase filament power to 28 to 32 amps until a light spark is seen. **DO NOT** exceed 50 amps on the meter.

At 4" source-to-specimen, about 1/6" of carbon point will deposit about 30 angstroms of carbon film. A ⅜" length of .040 inches reduced section will deposit about 100 angstroms of carbon.

For evaporating at relatively high pressure, it is good practice to check carbon film thickness. Coat a glass cover slip with gold. The gold color will change to copper when the cover slip is overcoated with 100 angstroms of carbon; to orange with 150 angstroms of carbon; to purple with 200 angstroms of carbon.

At 50 millitorr the average gas molecule travels about .04" between collisions. With a source-to-specimen distance of 4", the carbon will make many collisions. It will arrive from all available directions. Above 75 millitorr the thickness of the carbon film will diminish rapidly, as compared to the expected thickness.

If the carbon chamber will not pump below 100 millitorr, check by substituting the Desk II chamber. If that pumps down, then the trouble is probably with the "L" gaskets on the carbon chamber. Wipe them clean with a lint free cloth and acetone. Apply a thin coating of vacuum grease to the gasket on the glass side and on the baseplate side.

OPERATING THE CARBON YARN EVAPORATION ACCESSORY

The Carbon Yarn Evaporation Source is adjustable and is designed to provide carbon films for support, replication or conduction. The mounting posts are drilled and tapped to screw onto one of a pair of low-voltage feedthroughs. The rectangular extension block connects the upper post to the lower post. Two blocks clamp the carbon evaporation unit to the upper post. This arrangement gives flexibility to locate the source as desired.

NOTE

DO NOT permit the mounting post to touch the pumpout cover which is at baseplate ground. This would short the filament current directly to ground.

The carbon yarn evaporation unit is designed to use high-purity carbon yarn. The height is adjustable by loosening the screw holding the unit to the mounting post.

LOADING CARBON

The carbon yarn is placed across two spring loaded electrode posts. (Carbon sublimes go from solid to a gas with no liquid phase). When reloading, allow time for mandrels to cool as they get quite hot, especially when firing carbon for 30 seconds or longer.

EVAPORATION

The chamber should first be pumped to 2 x 10^{-5} torr or less.

Denton Vacuum supplies a carbon yarn of excellent quality. It is suggested that a low power setting, to degas the carbon, be used; slowly raise to evaporate. Degas the carbon (bright red) for 5 to 10 seconds. (Watch the chamber pressure rise, and then start to fall back.)

Carbon may be evaporated slowly or rapidly. Normally, after degassing, the power is increased to where the carbon starts depositing. Length of evaporation time will depend on the desired thickness of carbon film. It should take from 30 seconds to totally evaporate the carbon. **DO NOT** take power too high for more than one minute. **NEVER EXCEED 50 AMPS.**

A rapid evaporation (flashing) may be utilized by presetting the control to 75 percent of dial rotation and then turning on the power. The flash will last from 1 to 2 seconds and help reduce heat damage.

Carbon vaporizes due to localized heat caused by resistance to flow of electric current. Carbon resistance lowers as carbon heats up, but will stabilize.

COMMON SPARES

Description	Part No.
100 Reduced Section Carbon Rods	0084-001-059
Carbon Yarn (25 feet)	5095-004

REBUILDING KIT
FOR DESK II SPUTTERHEADS

Ref. D-0131-007-006

ITEM	PART NUMBER	QUANTITY	PART NUMBER
2	A-0108-018-044-1	1	Support Cathode
3	A-0108-018-044-2	1	Support Cathode
4	A-0108-018-045	2	Cathode Bushing
5	A-0108-018-046	1	Feedthrough Screw
6	A-0108-018-047-1	1	Cathode Screw
7	A-0108-018-047-2	1	Anode Cathode Screw
9	A-0108-018-049	1	Anode Insulator
17	5014-006	3	O-Ring
18	CG-708	1	Ring Magnet
19	A-0131-007-161	1	Bar Magnet
20	A-0131-007-113	1	Teflon Washer
21	4-40 x 1/4" Pan Head	4	Target Screws
22	5-40	2	Nuts
25	8-32 x 1/2"	4	Nylon Screws
32	B-0131-007-118	1	Teflon Ring
33	A-0131-007-117	1	Anode Bushing

PACKING UNIT FOR RETURN

1) If available, use original packing materials and box received with your system from Denton Vacuum. Pack as follows:

   a) Drain the oil from the pump.

   b) Secure the glass cylinder to the baseplate so it will not bounce and break during shipment.

   c) Wedge a polystyrene block under the mechanical pump to prevent it from bouncing during shipping.

If original packing materials are not available, subsection "d" applies.

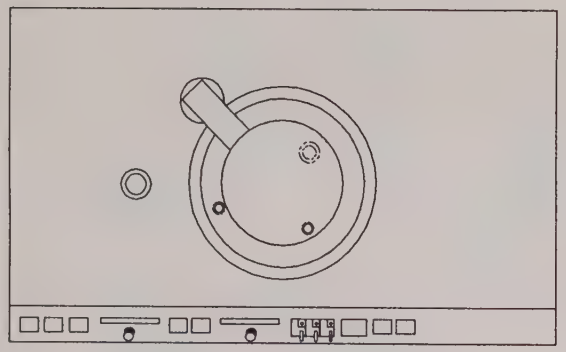
   d) Due to the weight of the mechanical pump, you cannot ship the unit by supporting it on its rubber feet. If using polystyrene or wood to support the unit, make sure these clear the support rod on the bottom of the unit. Place enough packing material under the unit so the weight is equally distributed on the bottom chassis.

   e) Ship the unit with a carrier that handles electronic equipment. We recommend Federal Express Standard Service.

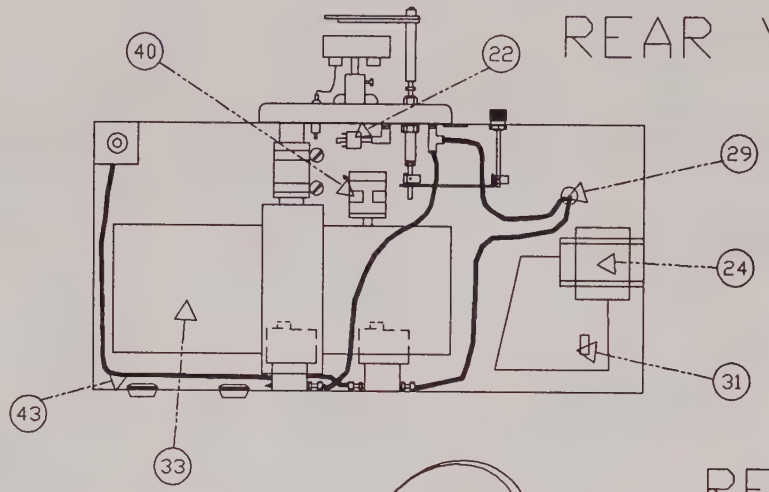
NOTE: If the above procedure is not followed, Denton Vacuum WILL NOT be responsible for any damages in shipment, including warranty work.

2) In the event that the unit is returned to Denton Vacuum with inadequate packing materials, Denton Vacuum will provide the packing materials at a charge of $75.00 to the customer.

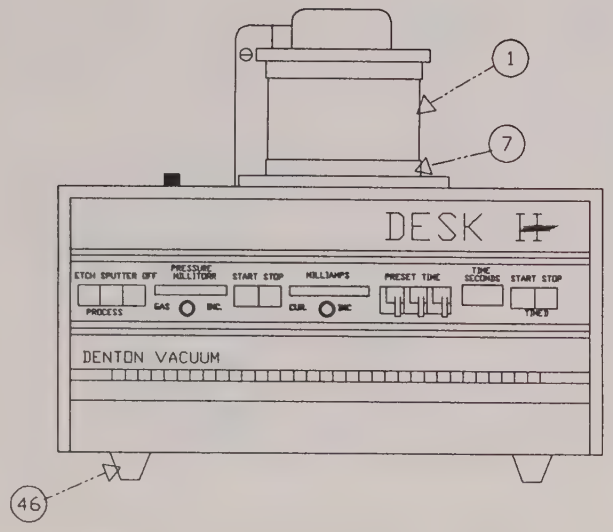
TOP VIEW



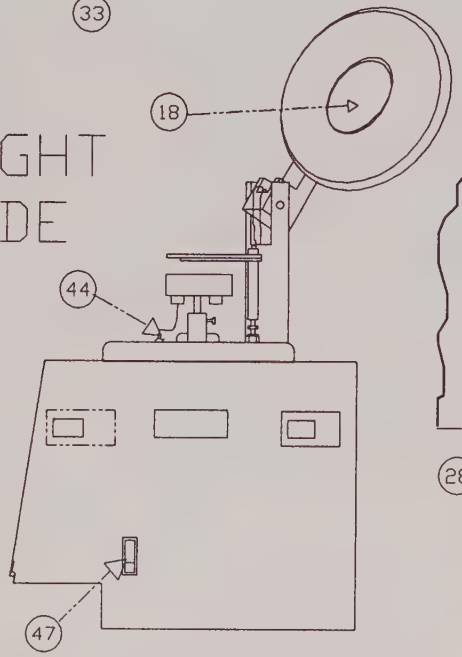
REAR VIEW



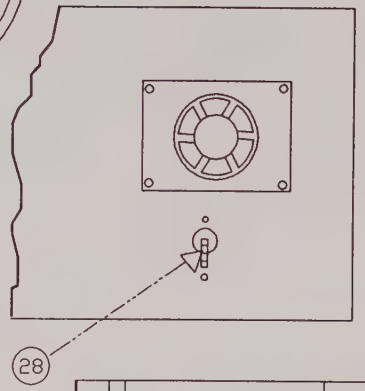
FRONT VIEW



RIGHT SIDE



REAR



QTY	DESCRIPTION	DWG/PART NO	REV
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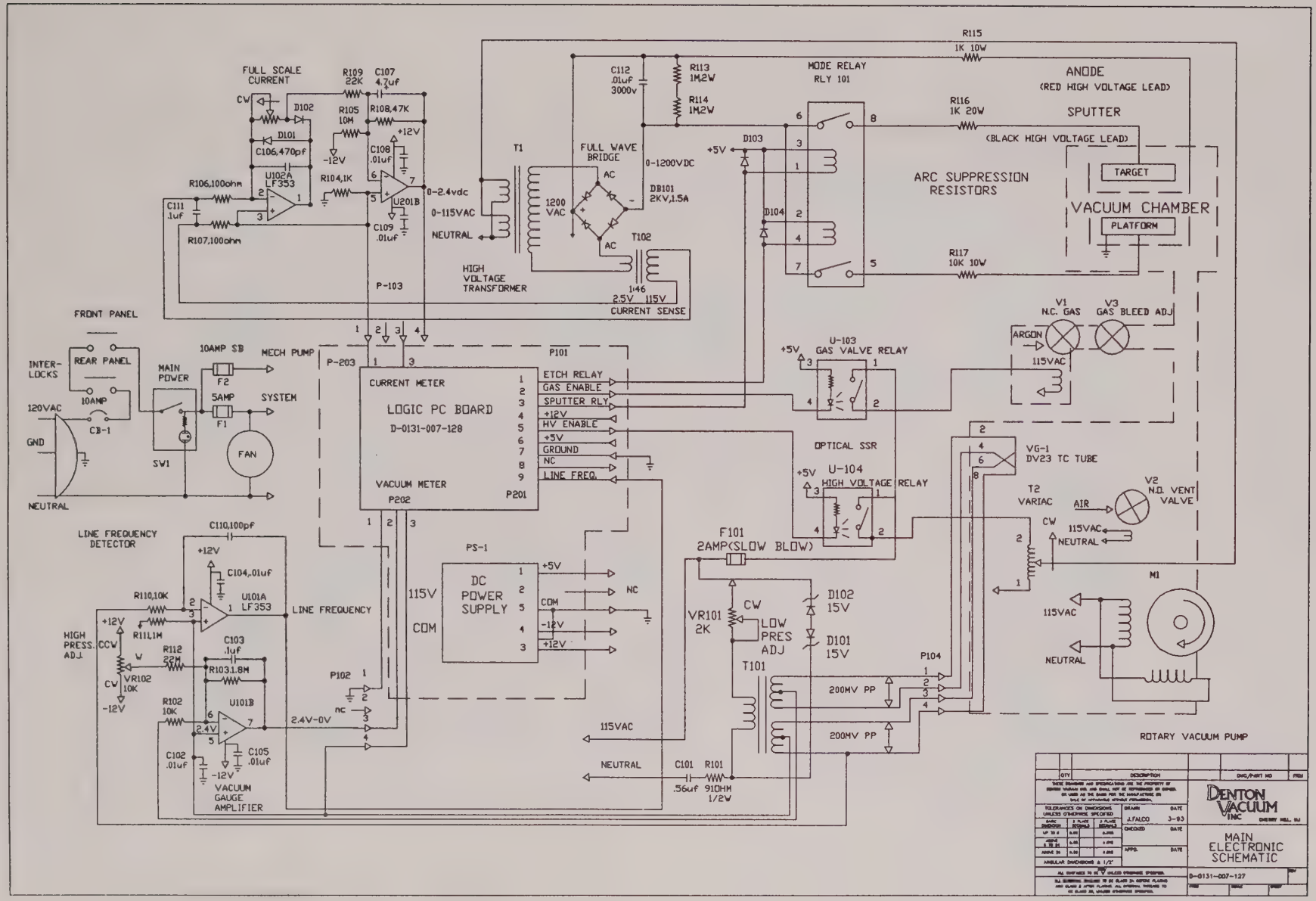
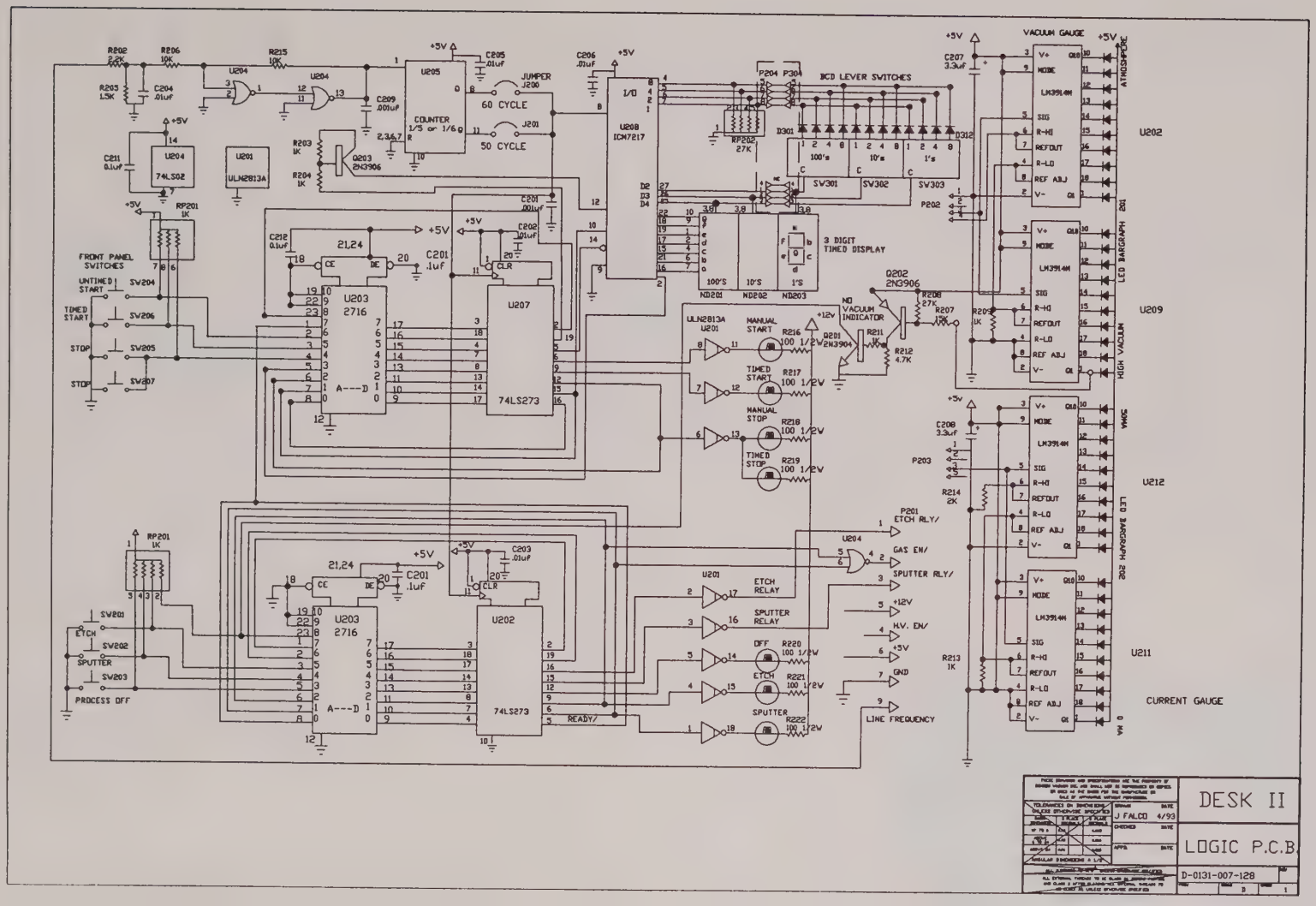
	TOLERANCES ON DIMENSIONS UNLESS OTHERWISE SPECIFIED: DRAWN J. FALCO 5/18/93 DATE; CHECKED DATE; APPD DATE	DENTON VACUUM	
	GENERAL ARRANGEMENT DESK II		
		D-131-007-001	C
		SIZE D	SHEET 1


FULL SCALE CURRENT
R109 22K
C107 4.7uf
CW
D102
R105 10M
R108,47K
+12V
D101
C106,470pf
C108 .01uf
-12V
U102A LF353
R104,1K
U201B
R106,100ohm
0-2.4vdc
C111 .1uf
0-115VAC
NEUTRAL
C109 .01uf
R107,100ohm
P-103
T1
FULL WAVE BRIDGE
AC
1200 VAC
DB101 2KV,1.5A
0-1200VDC
AC
T102
HIGH VOLTAGE TRANSFORMER
1:46
2.5V 115V
CURRENT SENSE
C112 .01uf 3000v
R113 1M,2W
R114 1M,2W
MODE RELAY RLY 101
D103
D104
+5V
R115 1K 10W
ANODE (RED HIGH VOLTAGE LEAD)
R116 1K 20W
SPUTTER (BLACK HIGH VOLTAGE LEAD)
ARC SUPPRESSION RESISTORS
TARGET
VACUUM CHAMBER
PLATFORM
R117 10K 10W
FRONT PANEL
INTER-LOCKS
REAR PANEL
10AMP
CB-1
120VAC
GND
NEUTRAL
MAIN POWER
SW1
10AMP SB
F2
5AMP
F1
MECH PUMP
SYSTEM
FAN
P-203
P101
CURRENT METER
LOGIC PC BOARD
D-0131-007-128
VACUUM METER
P202
P201
ETCH RELAY
GAS ENABLE
SPUTTER RLY
+12V
HV ENABLE
+5V
GROUND
NC
LINE FREQ.
U-103 GAS VALVE RELAY
OPTICAL SSR
U-104 HIGH VOLTAGE RELAY
V1 N.C. GAS
V3 GAS BLEED ADJ
ARGON
115VAC
VG-1 DV23 TC TUBE
T2 VARIAC
AIR
V2 N.O. VENT VALVE
CW
115VAC
NEUTRAL
M1
115VAC
NEUTRAL
ROTARY VACUUM PUMP
LINE FREQUENCY DETECTOR
C110,100pf
+12V
C104,.01uf
U101A LF353
R110,10K
R111,1M
LINE FREQUENCY
HIGH PRESS. ADJ
CCW
CW
VR102 10K
R112 22M
C103 .1uf
R103,1.8M
-12V
R102 10K
U101B
2.4V
2.4V-0V
C102 .01uf
C105 .01uf
VACUUM GAUGE AMPLIFIER
PS-1
DC POWER SUPPLY
115V
COM
+5V
NC
COM
-12V
+12V
P102
nc
F101 2AMP(SLOW BLOW)
VR101 2K
CW
LOW PRES ADJ
D102 15V
D101 15V
T101
P104
200MV PP
200MV PP
115VAC
NEUTRAL
C101 .56uf
R101 910HM 1/2W
DENTON VACUUM INC
MAIN ELECTRONIC SCHEMATIC
D-0131-007-127


DESK II
LOGIC P.C.B.
D-0131-007-128
J FALCO 4/93
VACUUM GAUGE
ATMOSPHERE
HIGH VACUUM
CURRENT GAUGE
LED BARGRAPH
BCD LEVER SWITCHES
3 DIGIT TIMED DISPLAY
FRONT PANEL SWITCHES
UNTIMED START
TIMED START
STOP
ETCH
SPUTTER
PROCESS OFF
MANUAL START
TIMED START
MANUAL STOP
TIMED STOP
ETCH RELAY
SPUTTER RELAY
VACUUM INDICATOR
ETCH RLY/
GAS EN/
SPUTTER RLY/
HV. EN/
GND
LINE FREQUENCY
READY/
JUMPER J200
60 CYCLE
50 CYCLE
COUNTER 1/3 or 1/6
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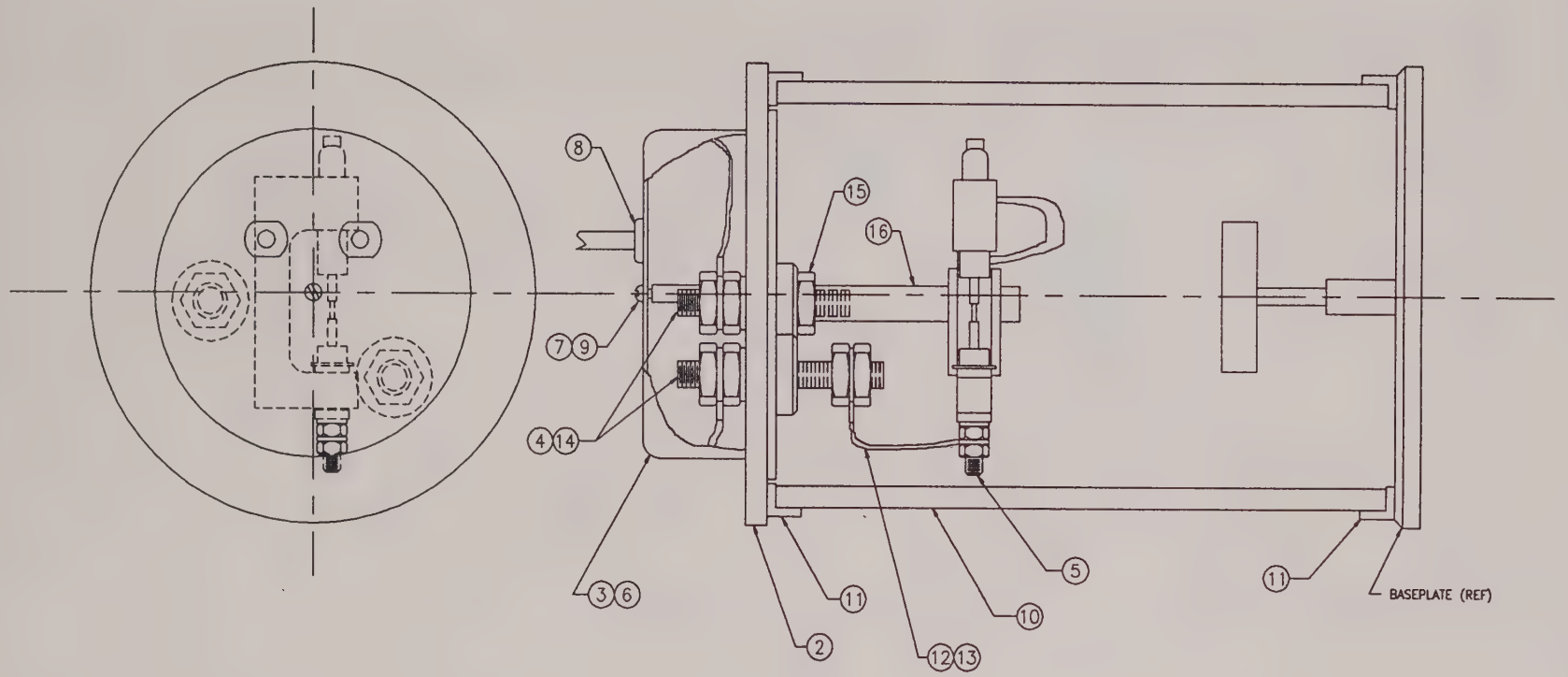

FILE: RODFIX

QTY	DESCRIPTION	DWG/PART NO	ITEM

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TOLERANCES ON DIMENSIONS UNLESS OTHERWISE SPECIFIED			DRAWN	DATE
BASIC DIMENSION	2 PLACE DECIMALS	3 PLACE DECIMALS	JOE B.	5/4/92
UP TO 6	±.02	±.008	CHECKED	DATE
ABOVE 6 TO 24	±.03	±.010		
ABOVE 24	±.06	±.016	APPD.	DATE

ANGULAR DIMENSIONS ± 1/2°

ALL SURFACES TO BE $\frac{\text{MIN}}{\sqrt{}}$ UNLESS OTHERWISE SPECIFIED.

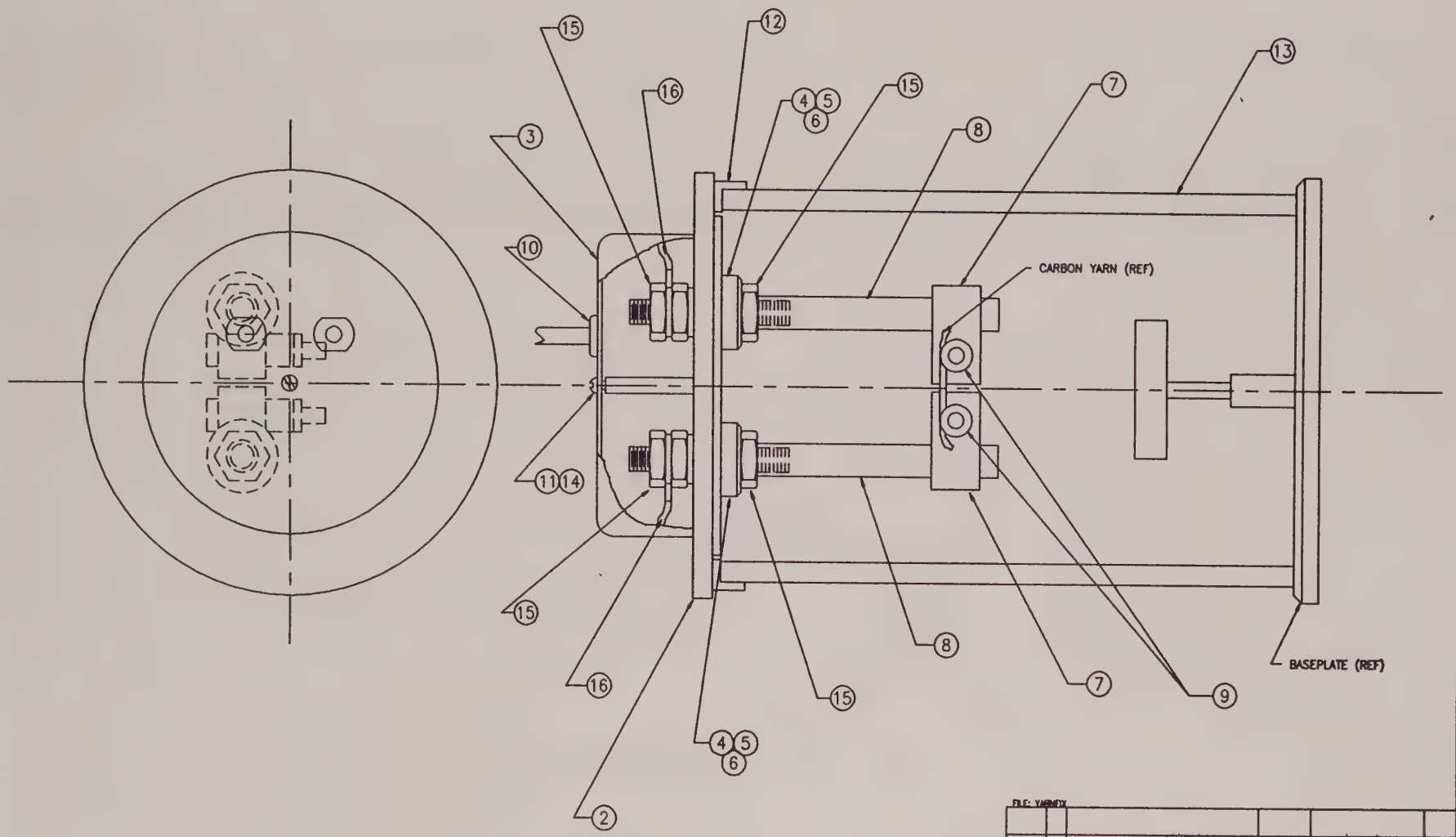
ALL EXTERNAL THREADS TO BE CLASS 2A BEFORE PLATING AND CLASS 2 AFTER PLATING. ALL INTERNAL THREADS TO BE CLASS 2B, UNLESS OTHERWISE SPECIFIED.

DENTON VACUUM INC
CHERRY HILL, NJ

CARBON ROD FIXTURE ASS'Y

C-0108-018-020 REV

PROJ | SCALE 1"=1" | SHEET



FILE: YARNFIX

QTY	DESCRIPTION	DWG/PART NO	ITEM

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TOLERANCES ON DIMENSIONS UNLESS OTHERWISE SPECIFIED

BASIC DIMENSION	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.05	±.010

ANGULAR DIMENSIONS ± 1/2°

ALL SURFACES TO BE ▽ UNLESS OTHERWISE SPECIFIED.

ALL EXTERNAL THREADS TO BE CLASS 3A BEFORE PLATING AND CLASS 2 AFTER PLATING. ALL INTERNAL THREADS TO BE CLASS 2B, UNLESS OTHERWISE SPECIFIED.

DRAWN JOE B. 5/4/92 DATE

CHECKED DATE

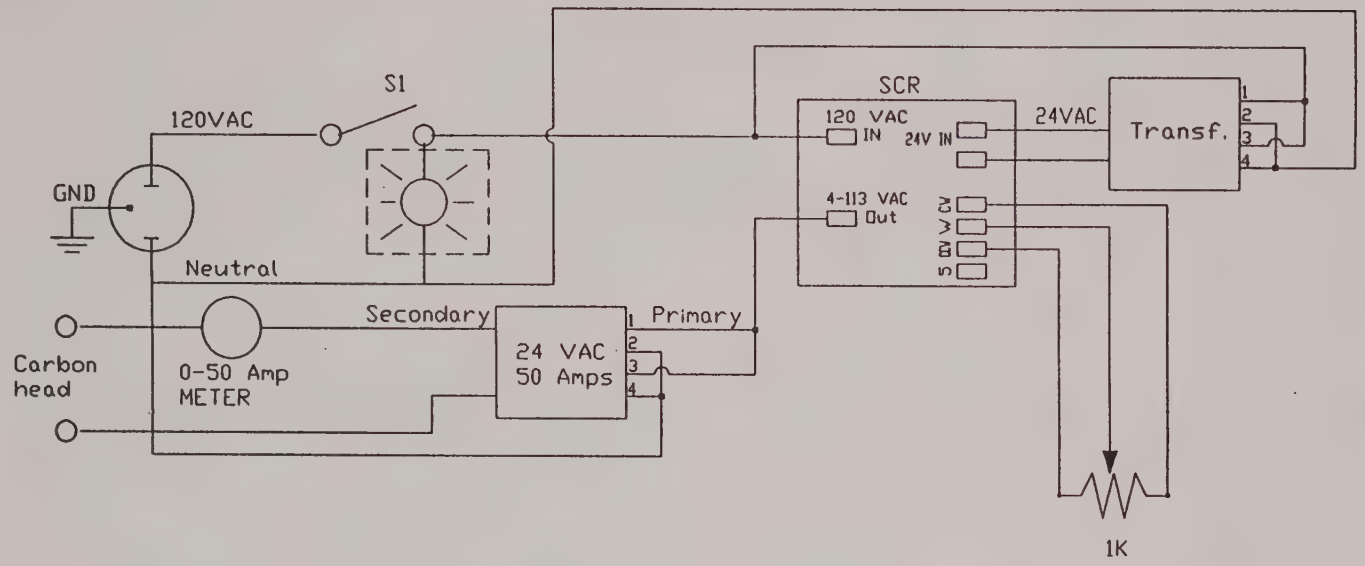
APPD. DATE

DENTON VACUUM INC CHERRY HILL, NJ

CARBON YARN FIXTURE ASS'Y (RAPID LOAD/ DESK II)

C-0131-005-009 REV

SCALE 1" = 1" SHEET



DENTON VACUUM INC. ELECTRICAL ENGINEERING DEPT.	DESIGNER:
ELECTRICAL SCHEMATIC 1kva L.V. Filament Supply 120v 60Hz	CHECKED: DATE: FILE: A-0075-020-003 Rev. B

SYM.	REVISION DESCRIPTION	DATE	APPROVED
A	ADDED ITEMS 36 & 37	8-4-86	
B	DELETED ITEM 37	9-2-86	
C	RE-LOCATED ITEM 3 CHANGED ITEM 12 TO 32	1-1-87	JRG

PENTON VACUUM, INC.

CHERRY HILL, N.J.

SPUTTER HEAD ASSY
DESK II

PROJ. NO.	D 0131-007 006	C
SCALE AS LISTED	SHEET	

S/N 16240

MP MASTER
MA26202